State Of California **The Resources Agency of California**

Memorandum

Date : February 22, 2000
Telephone: (916) 653-1614

To : William J. Keese, Chairman and Presiding Member
Robert A. Laurie, Commissioner and Associate Member

File: **Errata Part 1.Doc**

From : **California Energy Commission** -Richard K. Buell
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Subject : **ERRATA TO STAFF'S FINAL STAFF ASSESSMENT (FSA)**

Please find attached staff's errata for Socioeconomics, Revised Visual Resources Testimony, new Testimony on Visual Plume Analysis, and the resume of Joe Loyer who prepared the latter testimony. The Revised Visual Resources should replace in Visual Resources Testimony contained in the Final Staff Assessment (FSA) Part 1, filed on January 24, 2000. The Visual Resources figures in the FSA Part 1, should be retained and inserted in the revised testimony.

If you have any questions or comments, please call me at (916) 653-1614 or email me at rbuell@energy.state.ca.us.

Attachments

RKB:rkb

cc: Three Mountain POS List

ERRATA TO SOCIOECONOMICS
Testimony of James Adams

The following name should be added to the References section:

Ranslow, Rick. Coldwell Banker Realty. Telephone conversation with James Adams, December 14, 1999.

VISUAL RESOURCES

Revised Testimony of David Flores

SUMMARY

Staff's original Visual Resources assessment was submitted to the Energy Commission Three Mountain Power Plant Project Siting Committee on January 24, 2000. Since that time, the Energy Commission Air Quality staff has responded to the evaluation of the cooling tower plume analysis provided by the applicant. Staff has revised and provided clarification in various sections of the report based on their conclusion. This revised testimony replaces that original testimony.

Energy Commission staff analyzed both the potential visual impacts of the proposed Three Mountain Power Project (TMPP) and the compliance of the project with applicable laws, ordinances, regulations, and standards. Staff concludes that the project may cause significant adverse visual impacts in the area of Key Observation Point 3 that has a view of the power plant. This significant visual impact will be mitigated to less than significant levels by implementation of mitigation measures (light shielding and color treatment at power plant) requirements identified in this analysis. Also, the project after mitigation would not conflict with local policies regarding visual resources that are part of the applicable laws, ordinances, regulations, and standards.

INTRODUCTION

PURPOSE

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether the TMPP would cause significant adverse visual impacts and whether the project would be in conformance with applicable laws, ordinances, regulations, and standards. The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA) Public Resources Code section 21000 et seq. and Title 20, California Code of Regulations, section 1701 et seq.1. The determination of the conformance of the proposed project with applicable laws, ordinances, regulations, and standards is required by Public Resources Code section 25525.

ORGANIZATION OF ANALYSIS

This analysis is organized as follows:

- staff's analysis methodology;
- applicable laws, ordinances, regulations and standards;

1 The California Energy Commission's power plant siting regulations.

- the visual setting of the proposed power plant site, including linear facility routes;
- the visual impacts of the proposed project on the existing setting;
- compliance of the project with applicable laws, ordinances, regulations, and standards; and
- measures needed to mitigate any potential significant adverse visual impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.

METHODOLOGY

The methodology used in this visual assessment is described below and includes a description of the approach and process used, identification of the criteria used for visual assessment, and identification of the basis for identifying relevant significance criteria used in evaluating the impacts of the proposed project.

SIGNIFICANCE CRITERIA

Energy Commission staff considered the following criteria in determining whether a visual impact would be significant.

STATE

The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance. (Cal. Code Regs., tit.14, § 15382.)

Appendix G of the Guidelines, under Aesthetics, includes four questions to be addressed regarding whether the potential impacts of a project are significant. These questions ask whether the project would:

a) have a substantial adverse effect on a scenic vista;

b) substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

c) substantially degrade the existing visual character or quality of the site and its surroundings; and/or

d) create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

LOCAL

Energy Commission staff considers all local goals, policies or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Applicable Laws, Ordinances, Regulations, and Standards.

PROFESSIONAL STANDARDS

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see, e.g., Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities:

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?
- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?
- Will the project eliminate or block views of valuable visual resources?
- Will the project result in significant amounts of backscatter light into the nighttime sky?
- Will the project be in conflict with directly-identified public preferences regarding visual resources?
- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?
- Will the project result in a substantial visible exhaust plume?

KEY OBSERVATION POINTS

The applicant's visual consultant and Energy Commission staff selected Key Observation Points (KOPs), to provide the basis for evaluation of project impacts by comparing the appearance before and after project construction. KOPs include locations that are chosen to be representative of the most critical locations from which the project would be seen.

EVALUATION PROCESS

For each KOP, Energy Commission staff considered the existing visual setting and the visual changes that the project would cause to determine impact significance. The applicant used Viewing Positions in the visual resources section of the application (TMPP 1999a). Energy Commission staff evaluated the appropriateness of these locations for the analysis and agreed with the selection of locations.

ELEMENTS OF THE VISUAL SETTING

To assess the existing visual setting, staff considered the following four elements:

Visual Quality - The value of visual resources. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by "visually discordant human alterations, and do not provide views that people would find inviting or interesting" (Buhyoff et al., 1994). For projects in an rural setting such as the proposed project, visual quality typically

ranges from high, such as for a park or major water view, to low, such as for an area of heavy industry.

Visual Sensitivity - A measurement of the level of interest or concern of viewers regarding the visual resources in an area. Official statements of public values and goals reflect viewers' expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer sensitivity. Uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are highly sensitive. Commercial uses, including business parks, are generally moderately sensitive, with landscaping, building height limitations, and prohibition of aboveground utility lines demonstrating concern for visual quality. Large-scale industrial uses are typically the least sensitive because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Visibility - Visibility can differ substantially between view locations, depending on screening and the angle of view. The smaller the degree of screening, the higher a feature's visibility is. The closer the feature is to the center of the view area, the greater its visibility.

Viewer Exposure - The degree to which viewers are exposed to a view is affected by distance, the number of viewers, and the duration of view. Viewer exposure can range from having high values for all three factors, such as a foreground view from a large number of residences, to having low values for all three factors, such as a brief background view for a few travelers.

TYPES OF VISUAL CHANGE

To assess the visual changes that the project would cause, staff considered the following factors:

Dominance - One measure of change is *scale dominance* - the apparent size of an object relative to the visible expanse of the landscape and to the total field of view. Another measure of change is *spatial dominance* - the measure of the dominance of an object due to its location in the landscape. Dominance can range from subordinate to dominant.

Contrast – Visual contrast was evaluated in regard to the elements of color, form, line, and scale.[2] The degree of contrast can range from high to low.

View Blockage – View blockage is the blockage from view or elimination by the project of any previously visible components. Blockage of higher quality visual elements by lower quality elements causes adverse impacts. The degree of view blockage can range from strong to none.

[2] Scale contrast is the scale of an object relative to other distinct objects or areas in the landscape.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL AND STATE

The proposed project, including the linear facilities, is located on private lands and is thus not subject to federal land management requirements. Likewise, no roadway in the project vicinity is a designated or eligible State Scenic Highway. Therefore, no federal or state regulations pertaining to scenic resources are applicable to the project

LOCAL

SHASTA COUNTY

GENERAL PLAN

Shasta County has specific policies on visual or aesthetic resources that apply to TMPP. These issues are addressed in the Shasta County General Plan, Scenic Roadway Element, and Design Review Element and are implemented by the Shasta County Department of Resource Management (Shasta County, 1995). The Scenic Roadway Element of the General Plan provides criteria for establishing State Route 299 as an official scenic highway.

The Scenic Roadway Element of the General Plan provides criteria to protect the value of the natural and scenic character of the county's highways. The following guidelines have been developed to protect scenic corridors (State Route 299):

- Setback requirements
- Regulations of building form, material, and color;
- Landscaping with native vegetation, where possible;
- Minimizing grading and cut and fill activities;
- Requiring use of adequate erosion and sediment control programs;
- Siting of new structures to minimize visual impacts from highways;
- Regulation of the type, size, and location of advertising signs;
- Utility lines shall be underground wherever possible; where undergrounding is not practical, lines shall be sited in a manner which minimizes their visual intrusion.

The Design Review Element identifies the following means to achieving and enhancing the natural Environment:

- Use of appropriate building color;
- Fencing and screening;
- Maintenance of viewsheds, and;

- Use of natural vegetation and terrain.

Staff has addressed these requirements under the Condition of Certification section and in the compliance with the LORS section of this analysis.

PROJECT DESCRIPTION

The proposed TMPP will be a nominal 500-megawatt (MW), natural gas-fired combined cycle power plant located near Burney in Shasta County. The site occupies a portion of a 40-acre, triangular shaped parcel situated on the northwest side of State Route 299, approximately one-mile northeast of the town of Burney. A private access road, approximately 1,500 feet in length, provides access to the site from State Route 299. The northeast portion of the property is occupied by an existing biomass-fueled power plant. This facility consists of several structures, including a boiler with a 125-foot exhaust stack, a three-story operation/administrative building, a maintenance shop, cooling towers, and a substation. Other components of the existing facility include exterior lighting mounted on steel poles, water storage ponds, a wood chip storage pile, and a paved laydown area.

WATER SUPPLY LINE

A 24-inch water supply pipeline will be installed from the plant site to the Burney Water District distribution facility. The water pipeline will be installed below ground therefore, for visual resources assessment purposes, the visual impacts for the pipeline corridor routes are not considered significant.

NATURAL GAS PIPELINE

A new 12-inch gas pipeline will be required, as locally produced natural gas is not available on site. The facility intertie to the existing pipeline will be 2,900 feet in length. The project's gas supply line will be installed below ground therefor, for visual resources assessment purposes, the visual impact for the gas pipeline is not considered significant.

WASTEWATER PIPELINE

The applicant is currently proposing to dispose of waste water blowdown in percolation ponds to be located west of the project site, across the railroad tracks (see **PROJECT DESCRIPTION** Figure 2). A short wastewater pipeline will be constructed to content to the percolation ponds. For visual resources assessment purposes, the visual impact for the wastewater pipeline is not considered significant.

TRANSMISSION LINE

The proposed transmission line from the site follows the northern property line west approximately 800 feet to the existing railroad right of way and then goes 1,800 feet north to the existing 230 kV PG&E lines located north of the project. Dense conifer pines on both sides will line the transmission route. An existing 60 kV transmission line is located on the east side of the right-of-way, and the wood poles are approximately 65 feet in height. No public roads cross the proposed transmission

line route and public access to the route is limited to the property owners that border the power plant property. Because the railroad is used sporadically, the visual impact for the transmission line is not considered significant.

The project will require reconductoring of two existing 230 kV transmission lines for a distance of about 60 linear miles: 19 miles from the new transmission line tie-in to the Round Mountain Substation; 9 miles to the Pit 3 Substation; and, 32 miles from the Round Mountain Substation to the Cottonwood Substation, located south of the city of Anderson. The project description in the AFC (TMPP 1999a, p.1-5) states that 88 miles of transmission line will be reconductored; however, that consists of 28 miles of a double circuit line (counted as 56 miles) and 32 miles of a single circuit for a total linear distance of 60 miles. Reconductoring would make the lines only slightly more noticeable and would not noticeably lessen visual quality, therefore the visual impact for reconductoring of the transmission line is not considered significant.

SETTING

REGIONAL SETTING

The project site lies about 50 miles northeast of Redding in the Burney Valley. The landscape includes Burney Mountain and views of peaks such as Mt. Shasta and Mt. Lassen that reach over 7,000 feet in elevation.

The Burney Valley extends over three miles in length and the valley is enclosed on the west by a series of bluffs and mountain peaks. Lookout Mountain is the closest of the peaks to the project site, with an elevation of 4,520 feet. Burney Mountain lies approximately 5 miles south of the project site at an elevation of 7,863 feet. The community of Burney is situated at about 3,173 feet above sea level. Dense stands of mixed conifer trees are seen on the mountain slopes with the National Forest Service timberland surrounding much of the valley.

Communities in the project area include the unincorporated town of Burney with approximately 3,500 residents and Johnson Park, a community of approximately 500 residents, located approximately one half-mile northeast of the proposed power plant. In addition, small rural communities such as the several dozen homes on Vedder Road and Black Ranch Road are located approximately one mile northwest of the power plant site.

A scenic vista is located on State Route 299, approximately four miles southwest of Burney. From this vista point, panoramic views of Burney Valley can be seen to the east from an elevation of about 4,000 feet. Views of the valley are partially framed by conifer trees in the foreground and by the ridgelines and mountains in the distance.

PROJECT AREA SETTING

The project site will be located on a triangular 40-acre parcel surrounded by dense conifer trees. In addition to the proposed power plant facility, the property also

includes a biomass power plant, a loading facility, a maintenance facility, a 125-foot exhaust stack, cooling towers and a three-story administration building. The proposed plant site is set back about 500 feet from State Route 299. The plant will be developed in an area that was occupied by wood chips for the biomass plant. The only vegetation in the area of the project site consists of low-growing annual grasses.

KEY OBSERVATION POINTS

As provided in the AFC (AFC pg. 6.6-22, Section 6.6.1.5), the consultant structured the analysis of the project effects by identifying the view areas most sensitive to the project's potential visual impacts, and three Key Observation Points (KOPs) were selected for the development of photo simulations that could be used as a basis for visualizing the plant's potential effects. This analysis focuses on viewers who are highly sensitive to changes in the visual setting and on existing visual features that affect the visual quality, visibility, and visual exposure to the proposed project for those viewers. **VISUAL RESOURCES Figure 1** shows the location of the KOPs used in this analysis and the direction of each view.

Because the natural gas pipeline, water supply and wastewater lines will be underground and will be either not visible or not highly visible, KOPs were not identified or defined for these features. For the same reason, the alternative pipeline corridor routes are not considered part of the potentially affected environment.

KEY OBSERVATION POINT 1 – POWER PLANT

KOP 1 (see **VISUAL RESOURCES Figure 1** for location) represents the view toward the site from the access road (Energy Drive) into the project site. Although the public will not see this view, the KOP was selected because it provides an unobstructed foreground view of the proposed power plant as it will appear at the site.

Visual Sensitivity

Because the view represents the project site, viewer sensitivity is low.

Visibility

Approximately 5,700 vehicles per day travel on State Route 299. From a visibility standpoint, with the dense cover of conifer trees and the distance of TMPP plant from the state highway, the project will not be visible to the traveling public, and visibility will be low.

Visual Quality

The view of KOP 1 has the character of a landscape typical of a biomass power plant. Cooling towers, conveyor belts, boiler plant with a 125-foot stack, administration and maintenance buildings, and heavy equipment are elements of the landscape scene. Because existing industry characterizes this view and no features of higher quality are present, visual quality in this view is low.

Viewer Exposure

Approximately 5,700 vehicles per day travel on State Route 299. Due to the dense cover of conifer trees along the highway, the traveling public will not see the proposed power plant. Considering the small number of viewers (workers and occasional visitors) to the site, the viewer exposure is low.

KEY OBSERVATION POINT 2 - RAILROAD CORRIDOR

KOP 2 (see **VISUAL RESOURCES Figure 2** for location) represents the view of the new transmission lines on the west side of the existing railroad tracks. The AFC (pg. 6.6-24) discussed the Shasta Sunset Dinner Train that runs along this corridor at various times of the year. In a personal telephone discussion with a representative of the Mc Cloud Railway on November 3, 1999, staff was informed that the dinner train does not extend to this area, and the last train activity in this area was approximately five years ago for agricultural deliveries. There are no sensitive receptors with the sporadic nature of the rail line in this area; therefore no further analysis for KOP 2 is warranted.

KEY OBSERVATION POINT 3- OPEN MEADOW/VEDDER ROAD RESIDENTIAL AREA

KOP 3 (see **VISUAL RESOURCES Figure 3** for location) represents an open meadow /pasture area and a residential area approximately one mile northwest of the project site. Several dozen homes are within this rural residential area, with most homes situated within the forested areas. Approximated six homes lie at the edge of the trees along the open pasture area. Views of this area encompass open meadow in the foreground against a backdrop of forest in the middleground and mountains in the background. The existing biomass power plant and the proposed TMPP lie beyond the stand of conifer trees at the edge of the meadow.

Visual Sensitivity

Because of the residences in the area of KOP 3, viewer sensitivity is high.

Visibility

The existing conifer trees located along the eastern edge of the pasture will obscure the proposed power plant. However, from this visual point, the upper portion of the two stacks as well as the upper part of the turbine building roof would be visible above the trees. The new stacks would be somewhat taller than the existing stack that can also be seen from Vedder Road. Visibility is considered low to moderate.

Visual Quality

The view from KOP 3 is toward the east that takes in a panoramic view of the pasture and agricultural area, the stand of densely populated conifer trees and mountains in the background. Also in the view are the stacks from the existing biomass power plant that is partially screened by the trees. Considering these elements, visual quality is moderate to high.

VISUAL RESOURCES Figure 1
Key Observation Points

Viewer Exposure

The proposed power plant is in the middle ground from this KOP. The number of viewers is low, and the view duration is long. Therefore, viewer exposure is low to moderate.

IMPACTS

CONSTRUCTION IMPACTS

PROJECT SITE

The period of construction for the main site and offsite utility installation is expected to take about 20 months and would entail heavy construction equipment, laydown and storage area, and truck traffic. The power plant site is sufficiently far from residences that visual impacts due to construction would not be significant.

ELECTRICAL TRANSMISSION LINES

Construction activities for the transmission lines would involve drilling holes for tower foundations, installation of the foundation reinforcement and structure anchoring equipment, the placement of concrete for foundations, the installation of the structures, and the two transition stations.

The new electrical transmission tie-in lines would connect the PG&E substation to be located on the west side of the railway right-of-way, with the existing 230 kV lines located approximately 1,800 feet north of the project site. The new power poles would be tubular steel, approximately 118 feet in height with four cross arms per pole. As indicated in this report, visual analysis is not considered significant in the area proposed for the linear facilities. No sensitive receptors are present in the area of the railroad right-of-way as the tracks are used sporadically based on need.

NATURAL GAS LINES, WATER SUPPLY AND WASTEWATER PIPELINES

As indicated earlier in the staff analysis, the project's natural gas, water supply, and wastewater pipelines will be installed below ground therefore, for visual resources assessment purposes, the visual impact for the referenced underground pipelines are not considered significant.

OPERATIONS IMPACTS

KEY OBSERVATION POINT 1

Visual Resources Figure 1b shows the view from KOP 1 with the proposed project simulated in the view. As shown, the plant will not be visible from State Route 299 and although the project will add a major element to the view, from the perspective of KOP 1, the only individuals to see the plant will be the workers and visitors to the project site. From the perspective of form, line, color, texture, scale dominance, and spatial dominance, because of its location, and general consistency with the

existing biomass facility adjacent to the project site, the project will not appreciably change the character and quality of the landscape visible from the access road. It can be concluded that the proposed plant will not have a significant impact based on the following summary of visual factors for KOP 1:

- viewer sensitivity is low;
- visual quality is low;
- visibility is low;
- viewer exposure is low;
- the highest levels of contrast would be moderate;
- scale dominance would be negligible,
- spatial dominance would be co-dominant with the existing biomass facility adjacent to the proposed power plant facility; and
- view blockage would be negligible.

Considering all of these factors, the visual impact would be less than significant from the view area represented by KOP 1.

KEY OBSERVATION POINT 2

Visual Resources Figure 2B shows the view from KOP 2 of the proposed transmission line poles visible along the private railroad tracks. From this KOP, there are no sensitive receptors with the sporadic nature of the rail line in this area, therefore visual impacts would not be significant.

KEY OBSERVATION POINT 3

Visual Resources Figure 3B shows the view from KOP 3 as it represents the proposed project as seen from the meadow near the Vedder Road residential area, which is located more than one mile away from the project site.

Visual Sensitivity

Because of the residences in the area of KOP 3, viewer sensitivity is high.

Contrast with Structures

From KOP 3, most of the proposed plant facility will be screened by the existing conifer trees located along the eastern edge of the pasture and separated by Black Ranch Road. However, the upper portion of the two stacks (140 feet high) and the upper part of the turbine building (104 feet high) would be visible above the trees. The proposed earth tones of the power plant and stacks would contrast moderately with the gray tones of the existing power plant. The proposed power plant would cause a low level of contrast with the existing power plant adjacent to the project in regard to form, line, and scale.

Contrast with Vegetation

Vegetation visible in the view from KOP 3 consists of a variety of seasonal pasture grasses, agricultural land, and dense conifer trees. The vertical form of the power plant stacks would cause low contrast with the straight line and form of the conifer trees in the foreground. The proposed earth tones of the power plant stacks would contrast moderately with the green tones of the trees and agricultural fields. The stacks would not be substantially larger than the existing conifer trees, so scale contrast with vegetation would be low.

Contrast with Land/Water

No water is visible in this view. The landforms consists of flat natural land with dense conifer trees in the middleground and mountains visible in the horizon. The proposed power plant would contrast strongly with the horizontal line of the pasture in regard to form and line. The earth tone colors of the proposed power plant would cause low contrast with the natural terrain of the landforms of this viewpoint. The flat texture of the stacks would also cause low contrast with the texture of the land.

Because of the distance of the project from KOP 3, the increment of contrast with land added by the proposed structures would be small, and contrast with land would be low.

Scale Dominance

The group of proposed power plant stacks visible from this viewpoint would be small in size compared to the panoramic field of view and would occupy a small part of the setting. Therefore, scale dominance from KOP 3 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from KOP 3 is panoramic, the power plant stacks and building would be subordinate in regard to composition. Spatial dominance would not be prominent in regard to position. Because the power plant stacks and building would be almost backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant.

View Blockage

From KOP 3, the proposed power plant stacks and building would only block a small portion of the field of vision. Therefore, the amount of view blockage is minimal.

Visual Impact

It can be concluded that the proposed power plant and stacks will not have a significant impact based on the following summary of visual factors for KOP 3:

- viewer sensitivity is high;
- visual quality in this area is moderate to high;
- visibility is low to moderate;

- viewer exposure is low to moderate;
- the highest levels of contrast would be moderate;
- scale dominance would be subordinate;
- spatial dominance would be co-dominant; and
- view blockage would be minimal.

LIGHTING

Although the proposed power plant is in an industrial area, existing lighting levels are generally low in the immediate vicinity. Exterior lighting for the proposed power plant therefore has the potential to considerably increase lighting levels, creating glare, backscatter to the nighttime sky, and illumination of visible plumes. The applicant has proposed measures to reduce such impacts, and Energy Commission staff has expanded on these measures in the proposed conditions of certification.

VISIBLE PLUMES

COOLING TOWER PLUME CHARACTERISTICS

The potential exists for white vapor plumes (water vapor condensation from the exhaust) to be visible from the project stacks and cooling tower. The frequency, persistence, and size of visible condensate plumes depends primarily on the design and type of combustion turbine generator, heat recovery steam generator, auxiliary boiler, and cooling tower, as well as meteorological conditions of temperature and humidity.

McCulley, Frick & Gilman, Inc, a consultant for the applicant, prepared an independent plume analysis in response to staff's data request. The consultant provided modeling results for the frequency, duration, and size of the plumes from the project's cooling tower. The consultant's conclusion of their modeling analysis indicated that "due to the moist climate of the region, long condensed plumes may result during periods of elevated relative humidity. During daytime hours when local fog does not obscure the plume, typical condensed plume lengths are less than 131 feet and heights less than 131 feet above the tower" (TMPP 1999b, data response39).

The height of the proposed cooling tower is 57 feet. Because of the existing tree screening, plumes less than 20 meters (65 feet) would barely be noticeable. Therefore, staff only considered taller plumes in its impact analysis.

The predicted height of the plume above the cooling towers would be greater than 20 meters (65 feet) for approximately 90 percent of the time. For approximately 23 percent of the time, the plume height will be greater than 80 meters (262 feet), and greater than 1,000 meters (3,280 feet) for 9% of the time.

The predicted plume lengths are: greater than 30 meters (98 feet), approximately 88 percent of the time, greater than 40 meters (131 feet) approximately 40 percent of the time, greater than 400 meters (1,312 feet) approximately 18 percent of the time, and

greater than 10,000 meters (32,808 feet) for approximately 3 percent of the time. In all instances, plume height and length will be dependent upon meteorological conditions.

On February 8, 2000, Energy Commission air quality staff evaluated the independent plume analysis prepared by McCulley, Frick & Gillman and concluded that the analysis is complete and acceptable as an estimate of the potential visual impacts from the cooling tower steam plume. There was also recognition that very little meteorological data exists for the project site and surrounding area. Therefore, staff recommended that the use of this data with the understanding that the results may be less accurate than normal.

The consultant and Commission air quality staff agree that high relative humidity, stable atmospheric stratification and cool temperatures foster a long condensed plume. These conditions may produce long visible plumes during the hours near sunrise and sunset, but generally occur during the night when condensed plume would not be visible. Staff also acknowledges that a cooling tower plume would create less visual contrast during foggy conditions (approximately 6% annually).

Viewshed

The primary area of the viewshed is the Vedder Road residential area, which is not densely populated.

Visual Quality

The cooling tower plume's viewshed includes the Burney Valley and the surrounding mountains. The natural landscape of the area is generally forestland consisting of conifer and hardwood trees, grassland, and agricultural croplands. In addition, plumes from the two existing wood mills are part of the viewshed. Overall, visual quality is moderate to high for travelers on State Route 299 and for residents in the Vedder Road area.

Viewer Sensitivity

The plume would generally not be visible from State Route 299. The occasional traveler will stop along the scenic pullout on State Highway 299, located approximately six miles southeast of Burney. Viewer sensitivity for the residences in the area of Vedder Road and travelers who stop at the scenic pullout would be high.

Visibility

For the public traveling along State Highway 299, the view of the Burney Valley at the scenic pullout (approximately six miles from the project site) would be of relatively small scale, therefore visibility would be low to moderate. For the six residences along Vedder Road with direct views of the plant site, the visibility of the plume is moderate because the front view of the homes face away from the plant site and the trees along the perimeter of the residential area provides a screen of the plume.

Viewer Exposure

The factors determining viewer exposure are distance, the number of viewers and the duration of exposure. Because of the meteorological conditions in late

November through March, plumes tend to be larger. However, during these months, fog may also occur and the consultant has determined that plumes will not be visible 6% of the time.

The viewing distance at the scenic pullout on State Route 299 is background. The number of travelers stopping at the scenic pullout is low. The duration of view is short due to the variable presence and size of the plume and due to the large variety of views available. Considering these factors, viewer exposure is low.

For the residences in the Vedder Road area, viewer distance is middleground. The number of residences is small. The duration of view is low because trees screen the residences. Considering these factors, viewer exposure is low due the small number of residences and screening by trees.

Visual Impact Susceptibility

For travelers on State Route 299, visual quality is moderate to high, visual sensitivity is high, visibility is low to moderate, and viewer exposure is low. Considering these factors, for travelers on State Route 299, visual impact susceptibility is low.

For residences on Vedder Road, visual quality is moderate to high, visual sensitivity is high, visibility is moderate, and viewer exposure is low. Considering these factors, for residents on Vedder Road, visual impact susceptibility is low.

Visual Impact Severity

Contrast

Existing Structures

Because the existing power plant is not visible from public view areas, the proposed project would not cause contrast with existing structures.

Vegetation

The variable form of the cooling tower plume would cause moderate contrast with the high vertical form of the conifer trees surrounding the project site. The plume would cause high contrast in regard to the horizontal line of the vegetation. The white to light gray color of the plume would create high contrast with the dark green colors of the trees. The plume's soft, irregular texture would contrast moderately to the more distinct but regular texture of the forest trees. The plume would cause high contrast with the trees in regard to scale because it would appear taller than any vegetation when it is visible. In summary, in regard to vegetation, the project’s cooling tower plume would cause high contrast in regard to line, color, and scale, and moderate contrast in regard to form and texture.

Land/sky

The cooling tower plume would cause high contrast with the angular forms of the mountains. The plume would cause high contrast in regard to the generally straight

line of the various mountains. The plume would cause high contrast regarding color when the sky is clear and low contrast when the sky is cloudy. The plume would cause moderate contrast with the moderately varied texture of the land. The plume would cause high contrast with the scale of the land, appearing taller than any land feature. In summary, in regard to land/sky, during the limited times over the year that the cooling tower plume would occur, the proposed project would cause high contrast in regard to form, line, color, and scale, and moderate contrast in regard to texture.

Scale Dominance

The cooling tower plume from the proposed project, although it would occur only during limited times of the year, because of its height and width and middle ground distance, would be a prominent element in the field of view, so the plume would create a dominant level of scale dominance.

Spatial Dominance

The cooling tower plume from the proposed project would vary in its location in the view depending on the viewpoint, so its spatial dominance would vary from subordinate to prominent in regard to composition. Because of its middle ground location, spatial dominance would be between prominent and subordinate in regard to position. Because the plume would be partially backdropped by sky, spatial dominance in regard to backdrop would be between prominent and subordinate. Overall, spatial dominance would be co-dominant.

View Blockage

For the traveling public and residents of Vedder Road in the viewshed of the plume, during the limited times over the year it would occur, the plume would block a small portion of the view of the various mountains. Therefore, the severity of view blockage would be low.

Visual Impact Severity

Because a) contrast with vegetation would be high in regard to line, color and scale, b) contrast with land/sky would be high in regard to form, line, color and scale, and c) scale dominance would be dominant, the cooling tower plume's visual impact severity would be very strong (see VISUAL RESOURCES Table B-1).

Visual Impact

For travelers on State Route 299 and for Vedder Road residences, visual impact susceptibility is low, and visual impact severity is very strong. Therefore visual impact is less than significant.

BURNEY RESOURCE GROUP COMMENTS

On January 10, 2000, staff received comments from the Burney Resource Group (BRG) of their assessment of the Preliminary Staff Assessment for Visual Resources. This analysis addresses the three areas in which they have indicated will cause a significant adverse visual impact.

The three areas of concern are: 1) adverse effect on a scenic vista, 2) degradation of the existing visual character or quality of the site and its surroundings, and 3) creation of a new source of substantial light or glare affecting day or nighttime views in the area. The general area of concern of the BRG is from KOP 3 which represents the proposed project as seen from the Vedder Road residential area, which is located more than one mile away from the project site.

From the perspective of visual analysis, an adverse visual impact occurs with public view when: (1) an action perceptibly changes existing features of the physical environment so that they no longer appear to be characteristic of the subject locality or region; (2) an action introduces new features to the physical environment that are perceptibly uncharacteristic of the region and /or locale; or aesthetic features of the landscape become less visible (e.g., partially or totally blocked from view) or are removed.

The visual character of the project and effect of the project on a scenic vista were fully addressed in staff's analysis under the Impact and Plume section of this report. In brief, staff concluded that the visual impact was less than significant since the view of the physical plant structures would barely be discernable from KOP 3. As indicated in staff's analysis, the upper portions of the combustion emission stacks and turbine building roof would be visible above the trees. The applicant as well as staff has recommended mitigation measures (i.e., painting requirements of the physical plant) that will ensure the plant's color consistency with surrounding landscape colors. In addition, the applicant and staff have recommended additional planting of trees and vegetative buffers to ensure screening of the project.

As provided in the Visible Plumes section of this report, frequency, persistence, and size of the visible condensate plume will be dependent on meteorological conditions of wind, temperature and humidity. The Burney Resource Group indicated that the meteorological data used by McCulley, Frick & Gilman in the plume analysis may not be representative of the valley floor conditions. Energy Commission air quality staff believe that the meteorological data is acceptable for conducting a plume analysis. In addition, due to the small number of viewers within the Vedder Road residential area, staff concluded that the visible plumes would not cause a significant visual impact.

The existing lighting at the proposed plant site will be totally revamped to ensure that glare and backscatter does not occur. In reviewing the project site with the applicant's representative, illuminated lights on wooden poles (approximately 90 feet in height) were viewed. These lights were utilized during evening hours to assist the site crew in removing wood chips for use at the biomass plant. The applicant's representative indicated their intent to remove the lighted poles and install lighting that will be shielded and placed so as to minimize off-site light and glare. Staff has provided in this report mitigation that will ensure compliance. Staff has also proposed a condition that will minimize off-site lighting for the proposed power plant.

In reviewing the BRG's comments, it is staff's belief the proposed plant does not substantially change the physical environment or characteristics of this area. In

addition, based on staff's analysis, approval of this project will not introduce new features to the physical environment, which are uncharacteristic of the region.

CUMULATIVE IMPACTS

The physical structures of the existing biomass power plant have not caused significant visual impacts. The existing biomass plant is barely visible from public view areas. Plumes from the biomass plant are visible but not considered significant because of the limited number of viewers.

The proposed power plant would be larger than the existing biomass facility, so the incremental increase in impact caused by the proposed project would be noticeable, but the impact would not be substantial because almost all of the proposed plant would be screened from view by trees. The proposed project would increase the industrial character of the vicinity, although the property has been zoned heavy industrial by Shasta County. Therefore, the proposed project is consistent with the County's zoning requirements.

Staff in reviewing the applicant's independent plume analysis determined that, under certain meteorological conditions, the cooling tower plume would be noticeably wider than the plume from the existing biomass power plant because the proposed project would be larger in size compared to the biomass plant. Therefore, the cooling tower plume from the proposed project would add substantially to the existing impact caused by the cooling tower plume from the biomass power plant. However, because of the small number of viewers, the cumulative effect of both plumes would not be significant.

Existing lighting from the biomass power plant is visible from Key Observation Points 1, 2, and 3. The lights are sufficiently numerous and widespread so as to indicate the large mass of the power plant facility, adding an incongruous industrial element to the otherwise rural character of the area. The lights create backscatter to the nighttime sky when viewed from residences in the Vedder Road residential area. Considering these factors, the lighting on the existing biomass facility causes a significant visual impact. Methods recommended to reduce the cumulative lighting impacts for the existing and proposed power plants are discussed below under mitigation.

FACILITY CLOSURE

INTRODUCTION

There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure**.**

PLANNED CLOSURE

Planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence. The closure plan that the project owner is required to prepare should address removal of the power plant structures and the transmission poles to reduce visual impacts.

UNEXPECTED TEMPORARY CLOSURE

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency. No special conditions regarding visual resources are expected to be required to address temporary closure.

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. The contingency plan that the project owner is required to prepare should address removal of the power plant structures and the transmission poles to reduce visual impacts.

COMPLIANCE WITH LORS

LOCAL

COUNTY OF SHASTA

Shasta County has submitted conditions of approval (October 6, 1999) for visual resources which include structure painting, onsite lighting, and visual buffer requirements. The applicant has proposed to prepare a Landscape Plan, structural painting and painting requirements and visual buffers and intends to conform to the requirements of Shasta County. Once available, the applicant will send a copy of the specified visual requirements to the Energy Commission for review. Staff recommends the adoption of Conditions of Certification to ensure that the landscaping, structural painting, onsite lighting, and visual buffer requirements and its implementation satisfy the requirements of the Shasta County Resource Management Agency. Shasta County Planning Division and staff's analysis concluded that the height of proposed structures proposed for TMPP would not adversely affect surrounding land uses.

MITIGATION

APPLICANT'S PROPOSED MITIGATION

SPECIFIC MITIGATION MEASURES

The Applicant has proposed eight mitigation measures "to make the project more aesthetically acceptable" (TMPP 1999, p. 6.6-46 & 47):

- Roof material of new buildings will be painted brown or dark green or another suitable color to blend with the color of the existing conifer tree screening, particularly as seen from the Vedder Road residential area.
- The proposed stacks will be painted medium to dark brown or another suitable color to blend with the existing landscape. The selection of the final paint color will be made in consultation with Energy Commission staff and County officials.
- To minimize potential glare, all proposed structures including new fences will be painted or finished with a non-reflective treatment.
- Additional tree plantings will be installed along the fence line to increase the level of visual screening of the Facility as seen from State Route 299. New plantings will incorporate conifer trees.
- The existing tree buffer area located along the west side of the site will be preserved and maintained and a buffer of trees will be planted on the west side of the PG&E substation in order to screen the facility as seen from the Vedder Road residential area.
- Exterior lighting will include the use of non-glare fixtures. Lighting fixtures will be located and designed to avoid casting light or glare on off-site locations.
- The new sign for the Three Mountain Power Facility will be designed using material and colors that blend in with the surrounding landscape. Lighting for the sign will utilize non-glare fixtures and will be designed to provide focused illumination.
- Substation and Transmission Line poles and equipment will be treated in a flat, non-reflective finish and color to blend with the surrounding landscape.

EFFECTIVENESS OF THE APPLICANT'S PROPOSED MITIGATION MEASURES

The Applicant's proposed mitigation measures will act to reduce the potential significance of visual impacts associated with the generation project and staff generally agrees with the applicant's proposed mitigation measures in regard to color and lighting for the power plant. However, staff's position is that these measures need to be more precisely developed in conditions of certification, which staff proposes below.

STAFF'S PROPOSED ADDITIONAL MITIGATION

STAFF MITIGATION 1 (CONDITION 1)

A specific painting plan is needed to ensure that proposed colors will not unduly contrast with the surrounding landscape colors. Such a plan should be submitted at an early time so that any precolored buildings, structures and linear facilities can have colors approved and included in bid specifications for such buildings or structures.

STAFF MITIGATION 2 (CONDITION 2)

Staff has provides a condition which requires non-reflective and screened fencing to insure compliance with the requirements of the Shasta County General Plan's Design Review Element.

STAFF MITIGATION 3 (CONDITION 3)

A specific lighting plan is needed to ensure that project lighting will be adequately designed, shielded, and placed so as to minimize off-site light and glare. This plan should also minimize backscatter to the nighttime sky, and should include provisions to minimize lighting of plant areas, consistent with operational and safety needs. A procedure is also needed to resolve any lighting complaints.

STAFF MITIGATION 4 (CONDITION 4)

To offset the contribution of the Three Mountain Power Plant to project cumulative lighting impacts, the project owner shall also have the lighting at the biomass plant modified such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized.

STAFF MITIGATION 5 (CONDITION 5)

A specific landscaping plan should be prepared showing the location of such landscaping, the varieties and sizes of plants and trees (conifer) proposed to be used in such landscaping, and the proposed time to maturity for such landscaping.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

With application of the proposed mitigation, the visual impacts of the proposed power plant will be less than significant. Landscaping and the use of colors that blend with the existing setting will reduce the potential visual impact of the project structures to a less than significant level. Measures to minimize lighting effects will reduce such impacts to less than significant levels.

As discussed in staff's analysis of condensation plumes, meteorological conditions will determine the size and the duration of the plume during any given time. In addition, because of the project's rural setting, and limited affected residences in the

area, staff has determined that periodic condensation plumes will have a less than significant impact.

Staff has reviewed the proposed transmission line and determined that it would not adversely effect views significantly.

RECOMMENDATION

The Energy Commission should adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 Prior to the start of commercial operation, the project owner shall treat the project structures, buildings, towers, substation and tanks visible to the public in a non-reflective color to blend with the surroundings. The project owner shall treat the cooling towers with a heat-resistant color that minimizes contrast and harmonizes with the surrounding environment.

Protocol: The project owner shall submit a treatment plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

- specification, and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a detailed schedule for completion of the treatment; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall submit to the CPM a revised plan.

After approval of the plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the treatment plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the treatment plan from the CPM.

The project owner shall notify the CPM within one week after all precolored structures have been erected and all structures to be treated in the field have been treated and the structures are ready for inspection.

Verification: Not later than 30 days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty days prior to the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-2 Any fencing for the project shall be non-reflective.

Protocol: Prior to ordering the fencing the project owner shall submit to the CPM for review and approval the specifications for the fencing documenting that such fencing will be non-reflective.

If the CPM notifies the project owner that revisions of the specifications are needed before the CPM will approve the submittal, the project owner shall submit to the CPM revised specifications.

The project owner shall not order the fencing until the project owner receives approval of the fencing submittal from the CPM.

The project owner shall notify the CPM within one week after the fencing has been installed and is ready for inspection.

Verification: At least 30 days prior to ordering the non-reflective fencing, the project owner shall submit the specifications to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the fencing that the fencing is ready for inspection.

VIS-3 Prior to the start of commercial operation, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized. To meet these requirements:

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file and a carbon copy submitted to the CPM.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

Verification: At least 90 days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval. The CPM will notify the project owner of approval or disapproval within 15 days of receipt of the lighting plan.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting plan is ready for inspection.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

VIS-4 Prior to the start of commercial operation, to offset the contribution of the Three Mountain Power Plant to project cumulative lighting impacts, the project owner shall have the lighting at the biomass plant modified such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized. To meet these requirements:

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Exterior lighting is fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file and a carbon copy submitted to the CPM.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting modifications shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

Verification: At least 90 days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval. The CPM will notify the project owner of approval or disapproval within 15 days of receipt of the lighting plan.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting plan is ready for inspection.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

VIS-5 Prior to the start of commercial operation, the project owner shall implement a landscape plan that meets the requirements of the Shasta County Planning Department and provides a continuous screen of the proposed power plant.

a. The project owner shall submit to the Shasta County Planning Department for review and comment and to the CPM for review and approval a specific plan describing its landscaping proposal, stating that

it conforms to Shasta County Planning Department's requirements. The plan shall include, but not be limited to:

- a detailed landscape plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives;
- maintenance procedures, including any needed irrigation;
- a procedure for replacing unsuccessful plantings; and
- a fifty-foot vegetative visual buffer area on-site and adjacent to the property boundaries, excluding the northern property boundary which is adjacent to land located in the Timber Production (TP) district. Trees common to the area shall be planted, as necessary and existing trees within the 50-foot area shall be maintained in living condition. Planted trees shall be a minimum of 15-inch box in size. The intent of the buffer is to create a screen of vegetation to reduce visual impact from adjoining properties and roads.

b. If the CPM notifies the project owner that plan revisions are needed, the project owner shall prepare and submit to the CPM a revised plan for CPM approval.

c. The trees and shrubs shall not be planted before the plan is approved. The project owner shall notify the CPM when the trees and shrubs have been planted and are ready for inspection.

Verification: At least 90 days prior to the start of commercial operation, the project owner shall submit the proposed landscape plan to the Shasta County Planning Department for review and comment, and to the CPM for review and approval. The CPM will respond to the project owner within 15 days of receipt of the landscaping plan.

The project owner shall submit any required revisions within 15 days of notification by the CPM. The CPM will respond to the project owner within 15 days of receipt of the revised documents. The project owner shall notify the CPM in the next Monthly Compliance Report following completion of the proposed planting that the planting is ready for inspection.

VIS-6 The project owner shall comply with the requirements of the County of Shasta Conditions of Approval regarding screening of outdoor storage and refuse storage areas.

The project owner shall submit a plan for screening refuse and storage areas to the CPM for review and approval. The submittal shall include evidence from the County of Shasta that the plan conforms to the conditions of approval requirements submitted to commission staff on October 6, 1999.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the construction of the storage areas until the project owner receives approval of the submittal from the CPM.

The project owner shall notify the CPM within one week after the screening has been installed and is ready for inspection.

Verification: At least 30 days prior to installing the screening, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the screening that the screening is ready for inspection.

VIS-7 Prior to the start of commercial operation, the project owner shall design and submit to the CPM for review and approval a signage plan including specifications for the new signage identifying TMPP. The project owner shall not install the TMPP sign(s) until the signage plan has been approved by the CPM.

Protocol: The signage plan shall include the following design criteria which meets Shasta County Zoning requirements:

- Signage for purposes of site identification shall be limited to one monument sign;
- The monument sign shall not exceed six feet in height and not exceed 90 square feet in size. For a double faced monument sign, each face shall not exceed 45 square feet;
- The sign shall be setback a minimum of 12 feet from the front or street side property line and shall be located within a landscape island equal to a minimum of one-half the total sign area of the free standing sign.

If the sign is lighted, it shall have indirect illumination in which the light source is from within the cabinet or is from an outside fixture that distributes the light evenly on the sign.

If the CPM notifies the project owner that revisions of the signage plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Verification: At least 120 days prior to start of commercial operation, the project owner shall submit the TMPP signage plan to the CPM for review and approval. The project owner shall notify the CPM that the installed sign(s) is/are ready for inspection within 30 days of completion of installation.

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ATTACHMENT 1
LIGHTING COMPLAINT RESOLUTION FORM

LIGHTING COMPLAINT RESOLUTION FORM

THREE MOUNTAIN POWER PROJECT Burney, California
Complainant's name and address: Phone number:
Date complaint received: Time complaint received:
Nature of lighting complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted:
Description of corrective measures taken: Complainant's signature: _____ Date:
Approximate installed cost of corrective measures: $ Date installation completed: Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)
This information is certified to be correct: Plant Manager's Signature:

(Attach additional pages and supporting documentation, as required.)

VISUAL RESOURCES APPENDIX A

Visual Resources Figures 2 through 4a

VISUAL RESOURCES Figure 2

KOP 1 (Existing View of Proposed Power Plant)

VISUAL RESOURCES Figures 2a

KOP 1 (Simulation)

VISUAL RESOURCES Figure 3

KOP 2 (Existing View)

VISUAL RESOURCES Figure 3a
KOP2 (Simulation)

VISUAL RESOURCES Figure 4

KOP 3 (Existing View)

VISUAL RESOURCES Figure 4a
KOP 3 (Simulation

VISUAL RESOURCES APPENDIX B

Commission Staff's Visual Assessment Methodology

METHODOLOGY FOR ASSESSING VISUAL SETTING

VISUAL FACTORS

Commission staff evaluated a number of factors in assessing the visual setting of the proposed project. These factors include visual quality, viewer sensitivity, visibility, and viewer exposure.

VISUAL QUALITY

The visual quality of a setting is the value of visual resources in that setting, determined by the visible environment's intrinsic physical properties and by associated cultural or public values (Andrews 1979; Smardon et al. 1986). Where publicly adopted goals, policies, designations or guidelines exist, they are given great weight in assessing visual quality. Where they do not exist, the analyst relies on experience and judgment to assess visual quality. The relevant physical properties of the environment include landform, vegetation, water, color, scarcity, and cultural modifications.

A basic premise in the evaluation of visual quality is whether a project will be compatible with the character of the landscape. In the case of predominantly natural settings, projects should be compatible with this character. It is possible for new structures to be compatible with predominantly natural settings if such settings already contain some structures that are considered compatible and the new structures are similar to the existing structures and do not appreciably change the balance of natural and cultural elements. However, in areas that appear to be totally natural, any modification that appears to be human-made will change the character of the area.

VIEWER SENSITIVITY

One of the principal factors evaluated in assessing the potential for visual impacts is the sensitivity level of potential viewers. Viewer sensitivity is a measurement of the level of interest or concern of viewers regarding the visual resources of an area. It is generally expressed as high, moderate, or low. Local values and goals affect a viewer's expectations regarding a visual setting (Blair 1980). Concern regarding a change to a visual setting is often due at least in part to the symbolic effect of the change. A basic document for visual impact assessment states that

"more often it is symbolic meaning, not preference, which motivates our value judgments and reactions" (Schauman 1986, p.105).

A visual change can be perceived as a symbol of a threat to the cultural stability and identity of a group or community (Costonis 1982). Viewer sensitivity can be determined in two ways, directly through evaluation of viewer attitudes or indirectly using viewer activities.

VIEWER ATTITUDES (DIRECT)

The direct determination of viewer attitudes is normally done by surveying potential viewers. As mentioned above in the discussion on Visual Quality, the accurate determination of such information is very complex, involves well-designed, implemented and interpreted surveys, is usually labor intensive, and is usually expensive. Given these constraints and the mandated time schedule for power plant siting cases, it is generally not possible for Commission staff to conduct such a direct determination of viewer attitudes and be assured of accurate and valid results.

VIEWER ACTIVITIES (INDIRECT)

In situations where direct information on viewer sensitivity cannot be obtained, indirect methods are typically used in the visual profession to gain an insight as to viewers' sensitivity regarding visual resources. Land use is considered a "useful indirect indicator of likely viewer response" (Blair 1986), and activities associated with some uses can result in an increased awareness of visual or scenic resources (Headley 1992). Use activities associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are usually highly sensitive. Commercial uses are generally less sensitive as activities, and views are often focused on those commercial activities. Large scale industrial or agricultural processing facility uses are usually the least sensitive because workers are focused on their work, and often are working in surroundings with relatively low visual value.

VISIBILITY

Another important factor in assessing the existing visual setting, and thus potential impact is the visibility of the project. Visibility can differ substantially between view locations, depending on screening and the effect of the location of the visual change in the view. The smaller the degree of screening, the higher the visibility usually is and the greater the potential impact is likely to be. One factor potentially affecting screening is the season. Deciduous trees that provide substantial screening in summer may provide little screening in winter. Angle of view is also important. The closer the feature is to the center of the view area, the greater the impact is likely to be. Meteorological conditions can also affect visibility. For example, fog can make a cooling tower plume or stack plume unnoticeable, given particular fog density and distance from the viewer to the plume. Another factor affecting visibility is time of day. Although projects are generally more noticeable during daylight hours, lighting can make project structures and plumes more noticeable at night than during the day.

VIEWER EXPOSURE

The degree to which viewers are exposed to a view by (a) their distance from the feature or view in question, (b) the number of viewers, and (c) the duration of view is called viewer exposure (Grinde and Kopf 1986). Viewer exposure is important in determining the potential for a change in the visual setting to be significant.

DISTANCE

As the distance between the viewer and the feature viewed increases, the perceived size of the feature and the ability to see details decreases. Distance zones may be usefully categorized as follows: foreground, or close-range; middleground, or mid-range; and background, or long-range. Within close-range distances, details such as surface textures and the fullest range of surface colors are clearly perceptible. Mid-range distances are characterized by visualization of complete surface features such as tree stands, building clusters, and small landforms. Long-range distances are dominated by the horizon and major landforms (Felleman 1986).

NUMBERS OF VIEWERS

Two measures of the number of viewers are important to consider in assessing the potential visual impact of a project. One is the absolute number of viewers. The other is the proportion of viewers in a viewshed who can see the project.

DURATION OF VIEW

The length of time that a view is visible to a viewer is another important factor to be considered in determining the importance of a view and the potential impact of a project. For a given activity, the longer the view duration, the greater the potential importance or impact. View durations range from a few seconds, as in the case of some travelers in motor vehicles, to a number of hours per day, in regard to some residential situations.

KEY OBSERVATION POINTS

The evaluation factors discussed above are considered in relation to Key Observation Point. Key Observation Points are chosen to provide the basis for evaluation of project impacts by comparing the appearance before and after project construction. Key Observation Points include locations which are chosen to be representative of the most critical locations from which the project will be seen. Additional Key Observation Points should be selected that represent typical views encountered in different classes of views within the viewshed, if they are not covered by critical viewpoints. Variables that should be considered in selecting Key Observation Points include relative project size, season, and light conditions.

METHODOLOGY FOR ASSESSING VISUAL IMPACTS

USE OF OBJECTIVE VS. SUBJECTIVE METHODS

The determination of visual resource impacts has traditionally been done using a completely subjective method relying exclusively on the knowledge and experience of the visual resources professional. The drawback to this approach is that it is difficult to relate the steps and process used in the analysis which lead to the conclusions which are drawn regarding visual impacts.

In the 1970s and 1980s, there was an attempt in the profession to develop more objective methods for determining potential impacts. While this led to a more understandable set of steps and processes, analyses often did not account for

unusual situations not addressed by the standard procedure or gave the false impression that they were totally objective.

In recent years visual resource analysts have been developing a synthesis, in which an objective methodology has been used to develop the categories and the analysis process to be used in analyzing visual impacts, at the same time explicitly recognizing that subjective values are involved in selecting factors and assigning weights to factors. It is important that subjective judgements be identified and defined to the extent possible.

KEY OBSERVATION POINTS

As previously discussed, Key Observation Points include locations which are chosen to be representative of the most critical locations from which the project will be seen. For linear projects such as power lines, additional Key Observation Points are selected that represent any special project or landscape features such as skyline crossings, river crossings, or substations.

Because each Key Observation Point represents a critical location, a typical view encountered in a class of view, and/or a special project or landscape feature, it also represents an important specific aspect of the viewshed that is susceptible to visual impacts. Therefore, the visual impact of a project is determined for each Key Observation Point, not from an "overall" perspective that masks the specific impacts.

MAJOR IMPACT EVALUATION FACTORS

For each Key Observation Point Commission staff considers the susceptibility to visual impact and the severity of impact are considered together to determine the significance of impact. The following sections explain how these two major factors are assessed and considered. Other potential causes of significant visual impacts, such as night lighting, visible emission plumes, and noncompliance with laws, ordinances, regulations, and standards, are addressed separately in this analysis.

SUSCEPTIBILITY TO IMPACT

The first step in evaluating the visual impact of a project from a particular Key Observation Point is to consider the elements of the existing visual setting (discussed previously), including visual quality, viewer sensitivity, visibility, and viewer exposure. Each of these factors is assessed as either high, moderate to high, moderate, low to moderate, or low. Staff combines these factors into a measure of the susceptibility of the view from a particular Key Observation Point to visual impact. A low value for any of the four factors generally results in low susceptibility to impact.

IMPACT SEVERITY

As previously discussed, the degree of visual impact that a project will cause depends on the degree of change resulting from the project upon visual character or visual quality, here called the impact severity. Commission staff considers both the relationship of the project to the other components visible in the landscape, and

blockage from view or elimination by the project of any previously visible components.

RELATIONSHIP OF THE PROJECT TO OTHER VISIBLE COMPONENTS

Landscape Components

The three basic landscape components are land and water, vegetation, and structures.

Visual Elements

The basic elements of each physical component of a view include color, form, line, texture, scale, and spatial character. The impact of a project is assessed in terms of contrast in color, form, line, texture, and scale, as well as scale dominance and spatial dominance. Scale is the proportionate size relationship between an object and its surroundings. Absolute scale is the size of an object obtained by relating its size to a definitely defined standard (i.e., measurement). Relative scale is the relative size of objects; the apparent size relationship between landscape components. Sub-elements of scale include *scale dominance* (the scale of an object relative to the visible expanse of the landscape and to the total field of view of the human eye or camera) and *scale contrast* (the scale of an object relative to other distinct objects or areas in the landscape). *Spatial dominance* is the measure of the dominance of an object due to its location in the landscape. Regarding these three factors, a change has the greatest potential to cause impacts in regard to scale dominance, and the least potential in regard to scale contrast.

ASSESSMENT OF CONTRAST

Staff assesses contrast with existing structures, vegetation, and land/water in regard to color, form, line, texture, and scale. Regarding these factors, contrast in color, form, or line has greater potential to cause impacts than contrast in texture or scale.

The magnitude of the visual impact of a project is measured by the degree of change that it causes. In regard to contrast, the degree of change depends partly on the existing levels and types of contrast. For instance, if existing structures already contrast strongly with natural features, the addition of a similar structure tends to cause a smaller change than if no structures already existed. In addition, the degree of contrast depends on the proximity of the project to the landscape component to which it is compared. If a project is superimposed on a component (such as body of water), the potential for contrast is greater than if the project is near such a landscape component, and even greater than if the project is far from the landscape component.

FACTORS AFFECTING CONTRAST

Among the basic characteristics of the visual setting previously discussed, distance is a factor in determining the visual contrast that a project will create. Increasing distance can decrease perceived contrast both by reducing the apparent size of project structures and by reducing clarity of view due to atmospheric conditions.

Several additional factors can also influence the degree of contrast that a project may cause. These include atmospheric conditions, light conditions, motion, seasonal changes, and recovery time (BLM 1986).

BLOCKAGE OR ELIMINATION OF EXISTING ELEMENTS

In regard to obstruction or elimination of previously visible components, the analysis evaluates any change between the visual quality of those components compared to the visual quality of the project. Blockage of higher quality visual elements by lower quality elements can cause impacts, potentially as great as those regarding scale dominance.

ASSESSMENT OF VISUAL IMPACT SEVERITY

VISUAL RESOURCES Table B-1 shows how staff calculates impact severity from each Key Observation Point.

DETERMINATION OF SIGNIFICANCE

Commission staff considers the following factors in determining whether a visual impact will be significant. These factors are not a complete listing of all the considerations that staff uses in its analyses, because many such considerations are site-specific.

State

The California Environmental Quality Act Guidelines make it clear that aesthetic impacts can be significant adverse impacts by defining Asignificant effect≅ on the environment to mean a Asubstantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance. (Cal. Code Regs., tit.14, ∋ 15382.) Appendix G, subdivision (b), of the Guidelines state that a project Awill normally have a significant effect on the environment if will have a substantial, demonstrable negative aesthetic effect.

VISUAL RESOURCES Table B-1
Staff's Visual Impact Severity Assessment Process

	SEVERITY SCORE				
	Very Strong	**Strong**	**Moderate**	**Weak**	**Negligible**
SEVERITY FACTOR					
CONTRAST					
Color Contrast		High	Medium		Low
		Or	Or		or
Form Contrast		High	Medium		Low
		Or	Or		or
Line Contrast		High	Medium		Low
		Or	Or		or
Texture Contrast			High	Medium	Low
			Or	or	or
Scale Contrast			High	Medium	Low
			or	or	or
DOMINANCE					
Scale	Dominant	Co-Dominant	Subordinate		Insignificant
		Or	Or		or
Spatial		Dominant	Co-Dominant	Subordinate	Insignificant
VIEW BLOCKAGE	Substantial blockage of high quality view	Moderate blockage of high quality view or substantial blockage of moderate to high quality view	Minor blockage of high quality view, moderate blockage of moderate to high quality view, or substantial blockage of moderate quality view	Minor blockage of moderate to high quality view, moderate blockage of moderate quality view, or substantial blockage of low to moderate qual. view	Minor blockage of moderate, low to moderate, or low quality view; moderate blockage of low or low to moderate quality view; or substantial blockage of low quality view
COMBINED FACTORS	Two or more of the above factors with a severity score of strong.				

Local

As discussed above, Commission staff considers any local goals, policies or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts.

Professional Standards

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see, e.g., Smardon

1986). The questions listed below address issues commonly raised in visual analyses for energy facilities:

Will the project substantially alter the existing viewshed, including any changes in natural terrain?

Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?

Will the project substantially degrade the existing visual quality of the viewshed or eliminate or block views of valuable visual resources?

Will the project significantly increase light and glare in the project vicinity, particularly night-time glare?

Will the project result in significant amounts of backscatter light into the night-time sky?

Will the project be in conflict with directly-identified public preferences regarding visual resources?

Will the project comply with local goals, policies, designations or guidelines related to visual quality?

Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?

Will the project result in a substantial visible exhaust plume?

Commission staff considers these questions, where applicable, in its impact assessment.

CONSIDERATION OF IMPACT SUSCEPTIBILITY AND IMPACT SEVERITY

For most operations impacts staff considers the assessment of the impact susceptibility in relation to the impact severity from each Key Observation Point to determine visual impact. Staff considers construction impacts, lighting impacts, and visible plume impacts separately.

CUMULATIVE VISUAL IMPACTS

Staff reviews the proposed project and its related facilities as well as other past, present, and future projects in the vicinity to determine whether potential cumulative visual impacts will occur and whether those impacts will be significant. In addition, in the case of cogeneration facilities where the proposed power plant is to be part of an already existing industrial facility, this review examines whether the addition of the proposed project and its related facilities will result in cumulative visual impacts and whether they will be significant. If past activities have resulted in significant impacts, and the project will appreciably increase the total impact, the project will contribute substantially to a significant cumulative impact. When cumulative visual

impacts are found to be significant, whether in relation to other proposed projects or to the host industry, feasible mitigation measures will be recommended to reduce those impacts.

REFERENCES TO APPENDIX B

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THREE MOUNTAIN POWER PLANT, LLC

COOLING TOWER PLUME VISIBILITY ANALYSIS

TESTIMONY OF JOSEPH M. LOYER

INTRODUCTION

Staff reviewed and evaluated the cooling tower plume visibility analysis provided by the Three Mountain Power Plant applicant. The applicant's analysis was done to satisfy a staff data request (Staff Data Request # 39) which required the applicant to model the cooling tower plume using the Seasonal/Annual Cooling Tower Impact Program (SACTI). In staff's opinion, this is the most reasonable model available for this purpose. The SACTI model results are primarily driven by relative humidity, temperature and wind speed, but are also affected by air stability (which refers to the relative calmness of the air). As with all ambient air modelsk, SACTI is only an estimate whose results may not reflect real world events. Staff reviewed the modeling assumptions made, model results, and refinements to the results.

REVIEW

Staff compared the 1995 meteorological data used as an input to the SACTI model to existing 1985 Redding data (the nearest airport). The ambient temperatures were cooler in the project area, staying below 100 ^{o}F and above 20 ^{o}F. Wind speeds and directions seem to be very similar between the two locations. Relative humidity was not available at the Redding site. Based on this comparison, staff feels that the meteorological data used by the applicant is within reasonable parameters.

As a general practice for visual impact analyses associated with cooling towers, the analysis excludes hours in which visibility is impaired. The meteorological data used by the applicant does not provide a direct measure of visibility (as is practiced at most airports). Therefore, the applicant assumes that visibility is low when humidity is 100% and wind speeds are less than 2 mile per hour. The applicant also eliminated the nighttime hours (approximately half of the hours in a year). These refinements eliminated 53% (4,649 hours) of the meteorological file, leaving 4,111 hours to model. Staff does not agree that 100% humidity and wind speeds less than 2 mph indicate low visibility. From observations made of other meteorological data that included a visibility indicator, staff found that visibility was as likely to be good as much as poor under these conditions. While staff does not agree that low visibility is indicated when humidity is 100% and wind speeds are less than 2 mph, the applicant's refinements result in modeling more hours than would be typical in most cases. It is staff's experience that most meteorological files contain approximately 55-60% nighttime/low visibility hours.

In addition, staff found that the tables in the applicant's analysis which report cooling tower plume results for daytime, non-low-visibility hours (Tables 5, 6 and 7) were proportionally identical to the table for all hours (Tables 2, 3 and 4). What staff believes has been done, is that the proportions where kept the same between the two sets of tables and only the total hours were adjusted (from 8,760 to 4,111).

Cooling tower plumes predominately occur during nighttime hours, therefore eliminating nighttime hours should disproportionately eliminate more cooling tower plumes occurrences than what is reported in Tables 5, 6 and 7. While these are erroneous results in Tables 5, 6 and 7, they will tend to overestimate the steam plume occurrences and corresponding magnitudes.

While several factors above lead to an over-estimation of impacts, because of some of the definitions of the output parameters of SACTI, it is easy to understate the maximum steam plume size. Specifically, SACTI reports the length, height and radius of the steam plume. Length is the displacement along the x-axis, height is the distance from the top of the cooling tower to the mid-line of the steam plume an radius is the maximum radius of the steam plume. SACTI also does not correlate these dimensions with each other. So you can not determine if a plume will be 600 meters high, 40 meters long and 10 meters in radius all at the same time.

The meteorological data used by the applicant is only partially complete. It has several areas in which there is no data recorded. These holes account for approximately 13% of the hours. It is the recommendation of the United Stated Environmental Protection Agency that meteorological files containing more than 10% missing data should not be used for modeling purposes (USEPA 1992). However, under these circumstances there are very few options. Very little meteorological data exists for the project site. Therefore staff finds the use of this data acceptable with the understanding that the results may be less accurate than normal.

Notable in the applicant's analysis is Figure 3, Condensed Plume Length versus Relative Humidity. This graph indicates that noticeable steam plumes may occur at the cooling tower when humidity is between 30 and 80%. Humidity values in this range occur almost 50% of the time in the meteorological file the applicant used (including nighttime hours). Assuming that half these hours will be obscured by nighttime or low-visibility conditions, the applicant should expect that approximately 25% of the time a steam plume will be visible at the cooling tower.

ANALYSIS

There is an existing cooling tower in the vicinity of the proposed Three Mountain Power Project. At this time, staff does not have specific information regarding this cooling tower, except what is available in the Application for Certification supplied by the Applicant. A photograph in the AFC shows an existing cooling tower with three cells located east of the proposed facility. Other than the fact that this cooling tower is fairly old, nothing else is known. It is staff's opinion that, in general, comparing the SACTI results to an existing plume is the most reasonably accurate estimation available.

From other siting cases, staff has information on old, small cooling towers. In this case, staff chose a cooling tower used in the Pittsburg Power Plant siting case to represent the cooling tower in Burney. Staff intends to use the correct, specific cooling tower data when it becomes available. The cooling tower specification from

Pittsburg will be used as a place holder only. Cooling Tower Steam Plume TABLE 1 shows the basic differences between the Three Mountain Power Project and the existing cooling tower.

Cooling Tower Steam Plume Table 1

	Three Mountain	Existing Plume
Heat Rejection (MW)	365	unknown
Water Flow (gpm)	125,000	11985
Drift Rate (%)	0.0005	0.005
Number of Cells	8	3
Dimensions		
Height (feet)	57	29
Width (feet)	120	27
Length (feet)	220	90

Staff is specifically interested in plume formation during daytime, non-low visibility hours (referred to as non-fog daytime). Therefore, staff's analysis will focus on those hours only. Staff's Cooling Tower Steam Plume TABLE 2 shows the steam plume height in feet from the proposed power plant and the existing cooling tower. In general TABLE 2 shows that the existing plumes will be taller than those from the propose cooling tower. However, the width and depth of the plumes will be significantly different. The proposed cooling tower will be approximately 4 times as deep and 2 times as wide as the existing cooling tower. This means that a plume from the proposed cooling tower will be shorter, but much wider and thicker than the existing cooling tower plume. This will also result in a steam plume that more resembles a curtain than a single point source. TABLE 2 also shows an estimate of the height above the treetops that the plumes will rise. The treetops are assumed to be approximately 150 feet tall.

Cooling Tower Steam Plume Table 2

	Three Mountain				Existing Plume	
	Plume Height + Cooling Tower Height (feet)	Plume Height above Tree Tops (feet)	Number of daytime, non-fog Hours	% of daytime, non-fog Hours	Plume Height + Cooling Tower Height (feet)	Plume Height above Tree Tops (feet)
	90	-60	4111	100.00%	74	-76
	123	-27	3715	90.37%	119	-31
Estimated Tree Height	155	5	3109	75.63%	164	14
	188	38	1147	27.90%	208	58
	221	71	1025	24.93%	253	103
	254	104	1025	24.93%	298	148
	287	137	976	23.74%	343	193
	319	169	950	23.11%	388	238
	352	202	950	23.11%	433	283
	385	235	814	19.80%	478	328
	713	563	814	19.80%	926	776
	1,041	891	594	14.45%	1,375	1,225
	1,369	1,219	511	12.43%	1,824	1,674
	1,698	1,548	511	12.43%	2,272	2,122
	2,026	1,876	500	12.16%	2,721	2,571
	2,354	2,204	481	11.70%	3,170	3,020
	2,682	2,532	481	11.70%	3,618	3,468
	3,010	2,860	481	11.70%	4,067	3,917
	3,338	3,188	352	8.56%	4,515	4,365

CONCLUSION

Staff concedes that there are several problems with the analysis provided by the applicant, but points out that these problems tend to push the results in opposite directions and thus will tend to cancel each other out. Therefore, it is staff's opinion that the applicant's analysis is an acceptable estimate of the potential visual occurrence of the cooling tower steam plumes.

REFERENCES

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QUALIFICATIONS
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I am currently employed in the Energy Facilities Siting & Environmental Protection Division of the California Energy Commission as an Associate Mechanical Engineer. My responsibilities include air quality and hazardous material analysis in siting, compliance and policy work. I have worked on several siting cases and assisted in several modeling efforts. I have extensive experience with various compliance issues and have authored several policy papers for publication.